

Patterns and Relationships Unit	
Recognise a Pattern Patterning (Copy and Create) including numerical properties	Lesson 7
1 hour or 2*30 minutes (Excluding time on device)	Kindergarten
Outcomes	
NSW Syllabus - MAe-1WM – Describes mathematical situations using everyday language, actions, materials and informal recordings - MAe-5NA – Combines, separates and compares collections of objects, describes using everyday language, and records using informal methods - MAe-8NA – Recognises, describes and continues repeating patterns - MAe-15MG – Manipulates, sorts and describes representations of two-dimensional shapes, including circles, triangles, squares and rectangles, using everyday language - STe-7DI-T – Identifies digital systems and explores how instructions are used to control digital devices - STe-4MW-ST – Identifies that objects are made of materials that have observable properties	
Learning Intentions	Success Criteria
The children are learning to: - Distinguish between mathematical patterns and everyday patterns - Copy simple patterns - Create simple patterns	Children can: - Recognise a mathematics pattern - Copy an AB or ABC pattern - Create an AB pattern and an ABC pattern
Important Language to Emphasise	
Various language about attributes as developed in previous lessons: as well as repeat, unit, again and again, over and over, and so on, core, element.	
Physical Classroom Resources	
<i>Pattern Sniffers</i> by Kym Simoncini and Kevin Larkin (ELSA Book). A range of everyday objects (including natural and man-made materials), cloth (feely) bag, iPads, box to collect items that children can make patterns with. The objects can be used to create different patterns before being returned to where they came from.	

Lesson Background

Recognising a pattern

Patterns can be found in ideas, words, symbols, numbers, and images. They can also be found in behaviour, routines, in the language we use and in nature. Pattern recognition is the ability to recognise repeated sequences.

In this unit we focus on mathematical patterning, which is the repetition of a “unit”. In these patterning lessons we use letters to represent units of repeat – so a Square, Circle | Square, Circle pattern is described as an AB pattern and a High, Low, High | High, Low, High is described as an ABA pattern.

Patterning is an essential skill in early learning, particularly in the development of spatial awareness, sequencing and ordering, comparison and classification. The ability to recognise, identify, and create patterns not only supports mathematical learning e.g., counting, number structure, early geometry; it also contributes to broader social development as, by understanding patterns, children are able to make predictions about what might come next. They can eventually make predictions about what might have happened before based on the pattern that they can now see.

Copy a pattern

Children make an accurate copy of a pattern that they see. Where a sequence is repeated children will, through careful questioning and discussion, come to realise that the elements are repeated in the same order. A later development in copying a pattern is translation of a pattern where children copy the structure of a sequence exactly but use different objects e.g., a tower of blocks with the sequence; red, blue, green | red, blue, green becomes movement and sounds: jump, clap, whistle | jump, clap, whistle.

Copying a pattern helps children understand the repetitive structure of patterns and children should have patterning experiences during free play. Sometimes patterns will also include elements of ordering e.g., a pattern of even numbers 0, 2, 4, 6 – where the pattern is add two elements to the previous unit each time – and this knowledge is an important patterning milestone.

Create a pattern

Pattern creation involves the repetition of a specific sequence in order. Children can create visual, auditory and movement patterns e.g., shape patterns - circle, circle, triangle | circle, circle, triangle – which is called an “AAB” pattern; or movement patterns – turn left, turn right, spin around | turn left, turn right, spin around – or an “ABC” pattern.

Here the children have to imagine, and then create the repeating set of elements. Initially in this lesson, children will apply their knowledge of simple patterns, learned via copying, as they create their own, simple AB patterns. More sophisticated patterns will be created in lessons 8 and 9.

In the next three lessons we will use a range of different patterns – here are some examples represented symbolically with letters (accompanied by representation with objects, movements, sounds etc.).

AB = clap, jump | clap, jump | etc.

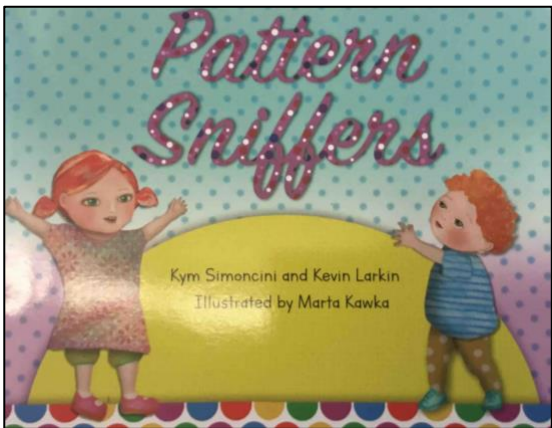
ABC = truck, doll, ball | truck, doll, ball | etc.

AAB = turn right (1/4 turn), turn right (1/4 turn), turn left (1/2 turn) | turn right (1/4 turn), turn right (1/4 turn), turn left (1/2 turn) | etc.

ABB = click, spin, spin | click, spin, spin | etc.

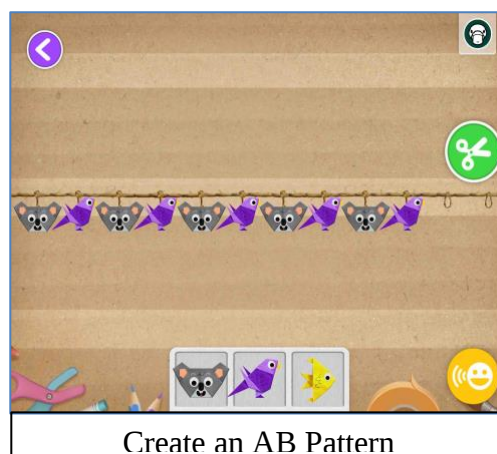
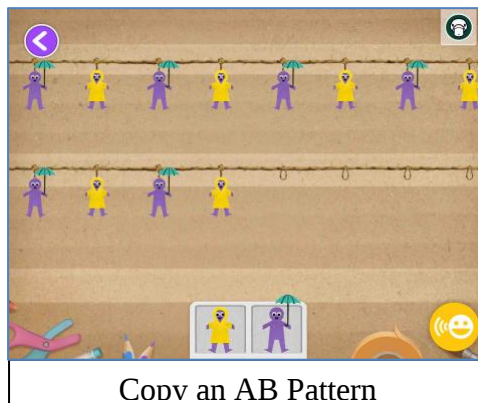
ABCD = triangle, square, circle, star | triangle, square, circle, star | etc.

Experience, Represent, Apply (ERA) Activities

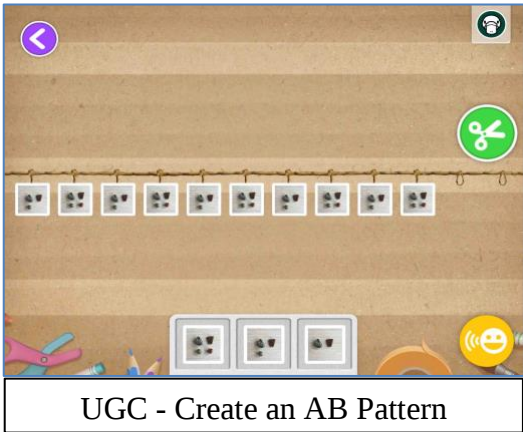
ERA	Exploring the concept of patterning (30-40 minutes)
E X P E R I E N C E	<i>Comparing, Matching, Ordering and Sorting</i> In this activity we confirm that the children understand the concepts matching, comparing, ordering, and sorting from previous lessons as these are pre-requisite skills for patterning. Have the children initially work in pairs to complete a range of comparing, matching, ordering and sorting. Each pair requires a range of objects. • Child One can decide which activity they would like their partner to complete. • Child Two then gets the to decide which activity they would like their partner to complete. <i>Pose questions similar to those used in previous lessons – where the focus is on identifying one attribute and then matching on that attribute, deciding on the magnitude of the attribute (comparing and ordering), or noting a difference in attributes to allow for sorting.</i> Patterning activities with objects can occur on non-numerical attributes (colour, texture, how objects move, what objects are made of, etc.) and numerical / geometrical attributes (shape, length, number of sides, number in a group). The activities in this lesson will largely focus on non-numerical attributes (including geometrical attributes) such as texture, size or shape. <i>It is important that the children realise that when patterning that they must choose one attribute to pattern with. They also should come to understand that the patterns they create will change depending on the attribute they have chosen to pattern with e.g. an ABCD pattern on shape needs four different attribute variations (square, circle, triangle, hexagon) whereas an AB pattern on shape only needs two different attribute variations (round, not-round).</i> <i>Read Pattern Sniffers</i> by Kym Simoncini and Kevin Larkin (ELSA Book). Pattern Sniffers is story about two children and their mother who discover mathematical and non-mathematical patterns as they go about their day. After you have read the story once, you can re-read and encourage the children to look for the main pattern on each page. But, as ‘pattern sniffers’, are there also other patterns to be discovered in the background? [Yes 😊] You can also consider these question prompts / ideas: • What pattern did the illustrator draw? • Do you see any other patterns on the page? • Are the patterns mathematical or non-mathematical patterns? • Can you represent the pattern from the book using materials in our classroom? By body movements? <i>(Continued on next page)</i> 

E X P E R I E N C E	(Continued from previous page) <i>Patterns, Patterns Everywhere!</i> Complete a variety of patterning activities with the children. You may like to set up a number of stations with various patterning activities on them. Here are some suggestions. The focus in the experience stage is that children pattern on non-numerical / geometrical attributes (height, mass, function, area etc.). Before starting the patterning activities, the children can watch this animation from Scootle, which introduces them to what a pattern is http://www.scootle.edu.au/ec/pinobject?objectId=M020202&pin=ITXBGA&userid=111026 <i>Station One – Sequence and patterns with movement</i> Make a movement sequence i.e., a series of movements that the children can copy. Use language to describe what comes first, next, last etc. Next make a movement pattern by completing a number of steps and repeating them (so the difference between a sequence and a pattern is that the pattern has elements that repeat) e.g. “Let’s make a pattern with how we move - Jump, Step, Jump Jump, Step, Jump etc.”. We can call this an ABA pattern where A is one type of movement and B is a different type of movement. <i>Station Two – Sequence and patterns with objects</i> Complete similar sequencing and patterning activities with objects in the classroom - blocks, beads, etc. For example, an AB pattern might be created using a large block then a small block, a large block then a small block. <i>Station Three – Copying Patterns</i> In these activities, it is important to emphasise the language of over and over or again and again. Emphasise the unit of repeat - so pause after large block in the following example small block, large block small block, large block etc. Children then copy the patterns you have made. • <i>Common objects</i> - blocks, leaves, cans, stones etc. and with elements for the particular celebration theme - e.g. if a classroom is celebrating a change of season the teacher can create patterns with leaves. • <i>Clapping a Name</i> - The name of each child is said to a clapping rhythm - later children can create a simple movement pattern to match the clapping. • <i>Bead Pattern</i> - A short pattern of beads is created - later children can create a simple movement pattern to match the beads. <i>Station Four – Tower of Blocks</i> A child builds a tower based on pictures / cards that the teacher has prepared e.g., by colour or by shape. A child sees a friend’s tower of bricks and copies it. As above, but this time the friend is the pattern checker to see if their friend has copied the card properly.
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ERA	On App Activity (Not included in the 1 hour)
R E P R E S E N T	In the app, children tap on the decorations cubby house to play a patterning activity called Let's decorate. They transition inside the cubby house where they can complete various patterning activities and then hang up their creations. First, children will see a wide variety of objects that they can use to complete patterning activities. These objects have attributes such as colour, size and shape (see picture right). Next, children will complete a variety of patterning activities and the tablet responds as children learn new skills by making the patterns more complex. In this lesson we will focus on children copying simple patterns (and perhaps them creating a simple pattern based on an earlier copied pattern). In contrast to most Represent activities, it is best that children play the patterning app individually as this reinforces the notion of unit of repeat (we will discuss at workshop). While the children are using the tablet, you can encourage the use of specific language to develop children's STEM vocabulary e.g. 'These are big and these are little. Oh, I see, you have completed a pattern with two things in it – one big and one little.' We can call this an AB AB pattern. Questions to ask These are examples of questions you can ask children to deepen and expand their app experience: • Can you tell me about the pattern you have created? • What shapes/sizes/colours can you see? • What is in each unit that repeats in your pattern? • Can we recreate your pattern using different objects? Movements? Things to observe Listen to how children use language when completing patterning activities. Notice the range of colours, shapes and sizes a child can identify. Children with established skills can combine multiple descriptions of their patterns, such as small red fruit, large green fruit small red fruit, large green fruit, etc. This builds upon the learning associated with sorting and with describing attributes. Create my own patterns Depending on the success children have with copying a pattern, the app may prompt them to create their own simple pattern. The picture above right is of a child creating a simple AB pattern. Once children are happy with their pattern, they click on the pair of scissors and "hang up" their pattern in the virtual cubby house.



ERA	Applying the concept (20 – 30 minutes)
A P P L Y	<i>Following on from the on-app patterning, children now copy simple patterns and create their own simple patterns based on numerical and geometrical attributes.</i> <i>Numerical and Geometrical Patterns</i> Complete a variety of patterning activities with the children. You may like to set up a number of stations with various patterning activities on them. Here are a number of suggestions – the focus in the apply stage is that children lead the activities and pattern on numerical or geometrical attributes only. <i>Station One – Sequence and patterns with movement</i> One child creates a movement sequence for their friends to copy e.g. - “Let’s make a pattern with how we move (the difference from the experience version is that numbers of movements are included) e.g., two jumps, three steps two jumps, three steps. This is still an AB pattern where A = two jumps and B equals three steps. <i>Station Two – Sequence and patterns with objects</i> Children complete similar patterning activities with objects in the classroom - blocks, beads, etc. e.g. An AB pattern might be created this time using square, triangle rectangle, triangle trapezium, triangle – with the children identifying the unit of repeat as four sides, three sides. If possible, use different types of triangles in the pattern to emphasise number of sides. <i>Station Three – Copying Patterns</i> In these activities, it is important that children emphasise the language of over and over or again and again and that they emphasise the unit of repeat. Their friends then copy the patterns the lead child has made. • <i>Common objects</i> - blocks, leaves, cans, stones etc. and with elements for the particular celebration theme e.g., the number of petals on flowers (3 petals, 4 petals, 2 petals 3 petals, 4 petals, 2 petals) is an ABC ABC pattern. • <i>Bead Pattern</i> - A short numerical pattern of beads is created by one child (4 red beads, 3 blue beads, 2 yellow beads, 1 green bean 4 red beads, 3 blue beads, 2 yellow beads, 1 green bean). This is copied by their friends. NB – as we are focusing on the numerical structure i.e., 4, 3, 2, 1 – children can change colours or shapes of beads as long as 4, 3, 2, 1 structure is maintained. <i>Station Four – Double Tower Trouble</i> A child builds a tower based on pictures / cards. Challenge here is for the child to double each of the elements. For example, if the picture card tower is 3 red blocks, 2 blue blocks, 1 yellow block then the copied tower would be 6 red blocks, 4 blue blocks and 2 yellow blocks. <i>(Continued on next page)</i>

	(Continued from previous page) User Generated Content (UGC). Using UGC is a way for children to apply their earlier learning from the experience and represent phase of the lesson. Here children need to: A a) decide on the pattern they wish to create; P b) choose the materials they will use to create P the pattern; L c) build the pattern with physical materials (or Y later with symbols e.g., numbers, letters, drawings); d) take individual photos of the elements that will create the unit of repeat (in the example to the right three stones and four stones); and e) recreate the pattern in digital form on the app (see picture right depicting pattern with small stones).  Next Lesson: In the next lesson children will continue to complete patterning activities; however, the emphasis will be on extending existing patterns – both to the right and to the left, which many children find more difficult. Children will also create their own patterns of increasing complexity.
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	Activities for Home
F A M I L Y	There are a number of activities that children can complete at home to support patterning. These activities are available from the Families App. <i>Noticing sequences and patterns</i> Look for opportunities at home, in the garden, at the shops to notice and discuss sequences and patterns. For example, your family may follow a sequence in the morning getting ready to head to school (wake up, breakfast, brush teeth, pack bag etc.).
A C T I V I T I E S	When sequencing, encourage your child(ren) to talk about what comes first, next, last etc. Sequencing of objects is slightly different to patterning. In sequencing activities, we want your child to describe the attributes (qualities) of objects that are in a series. They might be describing some shopping items e.g., can, packet, apple, soap, can etc. Later they might describe the same objects in a different way e.g., flat on top, squishy, round, slippery, flat on top etc. Sequencing will later lead to patterning. A shopping list would become a pattern if the same things were listed each week for an extended period of time. <i>Dinner time patterning / Patterning in the kitchen or in the laundry or the work shed</i> Patterning of objects is slightly different to the sequencing we saw before. Here we want children to recognise repetition of certain events - so there might be a pattern if you set the table for dinner (knife, plate, fork, glass) for each person. There might be a pattern in how the washing is hung out, or how the dishes are washed etc. Encourage your child(ren) to copy the pattern you have made with the dishes or the washing or the clothes pegs etc.